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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/042,666	03/17/98	GALVANAUSKAS	A A7139

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MM42/1227

EXAMINER

LEE, J

ART UNIT

PAPER NUMBER

2874

DATE MAILED: 12/27/99

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.
09/042,666

Applicant(s)
Almantas Galvanauskas et al.

Examiner
John D. Lee

Group Art Unit
2874

☒ Responsive to communication(s) filed on Nov 24, 1999

☒ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire THREE (3) month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

☒ Claim(s) 1-28 is/are pending in the application.

Of the above, claim(s) _____ is/are withdrawn from consideration.

☒ Claim(s) 14-27 is/are allowed.

☒ Claim(s) 1-13 and 28 is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been

☐ received.

☐ received in Application No. (Series Code/Serial Number) _____.

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☐ Notice of References Cited, PTO-892

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

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This Office action is responsive to the amendment filed on November 24, 1999. The previously applied 35 U.S.C. § 112, second paragraph, rejection has been obviated except for one problem in claim 28. That rejection is thus repeated below. For reasons more clearly explained below, the arguments regarding the 35 U.S.C. § 103(a) rejections are not persuasive and those rejections are also repeated.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim 28 is rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is believed that claim 28 is intended to depend upon 27 rather than upon claim 22, since there is no antecedent support for the term "said mode-locked fiber laser".

Claims 1-11 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 5,815,307 to Arbore et al. Arbore et al discloses an ultrashort pulse generator comprising an ultrashort optical pulse source and a wavelength conversion apparatus 10 for adjusting the chirp of the ultrashort optical pulse and converting the wavelength thereof (for example, to a second harmonic wavelength of the ultrashort optical pulse wavelength). The conversion apparatus 10 is a grating based device. Although not stated in the reference, such devices are well known in the art to include optical fiber gratings, so that the apparatus 10 could obviously be fabricated in an optical waveguide. The apparatus 10 of Arbore et al is also clearly an optical parametric device, operating on optical nonlinear principles to convert the wavelength of the ultrashort optical pulse therein. The second harmonic generation portion of the Arbore et al wavelength conversion apparatus constitutes a "mode

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converter" (as recited in applicant's claims 2 and 4). The use of adiabatically tapered input waveguides for ease of light insertion into other optical waveguides is well known in the art. The use of such an adiabatically tapered input waveguide in Arbore et al would thus have been obvious to the person of ordinary skill in the art. Note that the nonlinear material for wavelength conversion apparatus 10 can be a periodically-poled ferroelectric material such as KTP and isomorphs of KTP (column 6, lines 44-60, of Arbore et al). The specific ultrashort optical pulse source used in the reference is not identified, but the general discussion (see the paragraph bridging columns 6 and 7) indicates that a known ultrafast laser should be employed. This obviously implies that lasers such as those identified in applicant's claims 8-10 should be used, and the use of any of them would thus have been obvious to the person of ordinary skill.

Claims 12 and 13 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 5,815,307 to Arbore et al as applied to claim 1 above, and further in view of U.S. Patent 5,321,707 to Huber. The only difference between the Arbore et al device and that of applicant's claim 12 is that there is no amplifier upstream of the wavelength conversion apparatus 10 for amplifying the ultrashort pulses prior to conversion to a different (e.g. a harmonic) wavelength. The use of upstream and downstream amplifiers, such as rare earth doped optical fiber amplifiers, however, has been known in the art for a long time. Note, for example, the Huber reference, which shows a rare earth doped optical fiber amplifier 64 downstream of the active elements in a pumped active optical device. The person of ordinary skill in the art would have recognized that any optical signal that has been newly generated or converted will experience a loss in intensity as it travels along, thus necessitating the use of in-line amplifiers like that of Huber. It would thus have been obvious

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to use an upstream amplifier like the rare earth doped optical fiber amplifier 64 of Huber in the Arbore et al pulse generation device, providing the necessary amplification for the wavelength conversion apparatus 10. Regarding applicant's claim 13, the rare earth doped optical fiber amplifier of Huber includes erbium doped optical fiber amplifiers.

Claims 14-27 are allowed. The reasons are clearly stated in the previous Office action (paper number 4, mailed August 26, 1999).

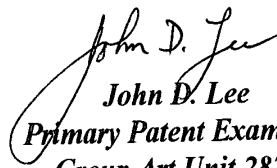
For the same reasons, claim 28 would be allowable if rewritten or amended to overcome the rejection under 35 U.S.C. § 112, second paragraph, set forth above.

Applicant's arguments filed on November 24, 1999, have been fully considered but they are not deemed to be persuasive. Applicant's arguments are all based upon the allegation that the Arbore et al reference is not applicable to optical parametric interactions in general and optical parametric generation in particular. Attention is directed, however, to the portion of Arbore et al beginning at column 12, line 59, which makes it abundantly clear that optical parametric generation is, indeed, encompassed by the teachings of the reference. Applicant's allegation regarding Arbore et al is thus inaccurate, and the rejection is entirely appropriate. Applicant further argues that optical parametric generation using pulse energies obtained directly from a femtosecond oscillator became possible only due to the fabrication of highly-nonlinear quasi-phase-matched waveguides in PPLN. This argument is not persuasive, though, because the rejected claims do not mention pulse energies from a femtosecond oscillator or quasi-phase-matched PPLN waveguides.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR § 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and an advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR § 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning the merits of this communication should be directed to Examiner John D. Lee at telephone number (703) 308-4886. Any inquiry of a general or clerical nature (i.e. a request for a missing form or paper, etc.) should be directed to the Technology Center 2800 receptionist at telephone number (703) 308-0956 or to the technical support staff supervisor at telephone number (703) 308-4854.


John D. Lee
Primary Patent Examiner
Group Art Unit 2874